

Chairman's Corner

Operating Procedures

by John Mumaw, Owens Corning

At the last Board Meeting in November, the final version of NFRC's long-awaited and much needed *Operating Policies Manual* was approved. Members will receive a copy in the mailing prior to the Boston meeting. I strongly recommend that you become familiar with the manual as it is now in effect. Since some time has gone by, I'd like to highlight for you what the procedures touch upon and why they were developed in the first place.

The Operating Procedures were developed to govern NFRC corporate management and are a supplement to the Articles of Incorporation, Bylaws, and NFRC program documents. They also govern the adoption, operation, and modification of NFRC rating systems and the NFRC Product Certification Program.

The Operating Procedures define:

- who is eligible to be a member as well what rights one has as a member of NFRC.

In the event of a conflict between the Operating Policies and the NFRC Articles of Incorporation or Bylaws, the Articles or Bylaws shall govern.

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Board of Directors Approves Establishment of TIPC

by Dariush Arasteh, LBNL
Chairman, Technical Steering Subcommittee

In order to streamline the process for issuing and implementing Technical Interpretations, the Board of Directors has recently established the Technical Interpretations Policy Committee (TIPC). This standing committee has been given the authority to enact Technical Interpretations (TIs)

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to procedures developed by the Technical Committee. At present, TIPC will implement TIs for the *NFRC 100-91SM*, NFRC 200, NFRC 300, and NFRC 301 procedures. As other technical procedures come on line (air infiltration, annual energy, condensation resistance), the TIPC will assume responsibility for implementing TIs relat-

ing to those procedures also. The establishment of TIPC will free up Technical Committee time for the development and updating of technical procedures. The TIPC will operate in much the same manner in which the Accreditation Policy Committee (APC) and Certification Policy Committee (CPC) operate.

There are seven voting spots on the TIPC chosen by the Board to represent the diverse membership of the NFRC. The TIPC will hold bi-monthly

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Window Market and R&D Goals in Korea

by Dr. Euy Joon-Lee, Korea Institute of Energy Research

According to a window market survey conducted in Korea, about 1 billion dollars was put toward the future of Korea's window market in 1995 and an additional 10% increase is expected by the year 2000. The survey indicated that more energy efficient windows at reasonable prices and a standard energy rating guideline are desired. The energy performance of more efficient, advanced windows need to be characterized by U-value, SHGC and air tightness, etc. Essentially, the Korean window markets' R&D goals are to develop higher energy performance windows by establishing a standard rating method in both analysis and experiment.

KIER (Korea Institute of Energy Research) operated by the governmental body, MOST (Ministry of Science and Technology), has started several programs to meet the needs of the window industry. Some of the projects concentrate on air-flow, as well as air tight windows. More advanced window research centering on low-E, electrochromatic, and vacuum windows will be developed in the next few years. The obstacle preventing these advanced windows from being developed is the lack of a national strategy to remove the technical barriers regarding their size and homogeneity which, subsequently, bars the manufacturing of these relatively expensive windows. One of the national renewable energy strategies for the year "2000 and Beyond Study," funded by government, is "Uniform Energy Labeling." This would help reduce the cost of these windows through a uniform manufacturing standardization which could drive a mass production, thereby lowering the price and facilitating their acceptance into the marketplace. Article 17 and 19 in the Law of Efficient Energy Use in Korea enforces

energy efficiency labeling for electric refrigerators, chillers, and lighting systems. Thus far, energy performance labeling for window products is not yet enforced. However, a rating system similar to the one developed in the United States, NFRC, will be announced in the near future stemming from a study entitled, "Renewable Energy Strategies for the Year 2000 and Beyond in Korea."

A uniform energy rating system for windows can be accomplished by experiment or analysis. KIER now has the experimental facilities to measure U-value, SHGC, and air-infiltration. KIER is also capable of simulating window energy performance based on a standard rule, *NFRC 100-91SM*. NFRC's label still needs further development in terms of incorporating other important parameters such as SHGC and air infiltration. Once done, it will be a solid reference label to compare the energy performance as a common basis for export and import of these optimum windows for Korean industries and customers. In Europe, subtask A of OECD Task 18: Applications Assessment and Technology Transfer has been lead by Australia. Our division at KIER is working closely with the SOLARCH group in New South Wales to create a joint workshop on "International Window Rating Programs" with NFRC in the future. The project goal is also to develop and to share the experience of using the standard, uniform method by both analytical and experimental tools, which can be applied, validated, and improved internationally. The analytical computer tools KIER now uses are WINDOW 4.1 and FRAME 4.0 and our experimental tools are a just completed procedure to measure SHGC—'95 KIER Solar Calorimeter-I in 1995 and '96 Calorim-

a rating system similar to the one developed in the United States, NFRC, will be announced in the near future

Our division at KIER is working closely with the SOLARCH group in New South Wales to create a joint workshop on "International Window Rating Programs" with NFRC

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eter-II in 1996—sponsored by the Korean government renewable energy R&D funds. The industry and KIER window R&D group in Korea are working hard toward a goal—an internationally compatible and uniform rating method for better harmonization in a world window society. □

Dr. Lee can be reached by e-mail at: ejlee@sun330.kier.re.kr

TIPC Formed

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meetings either via conference calls or at NFRC meetings. Members are appointed by the Board of Directors. The members are: Dariush Arasteh, Chair, Lawrence Berkeley National Laboratory; Bill Gorman, Milgard; Ken Nittler (U-value Subcommittee Chair), Westlab; Jeff Baker, Enermodal Engineering; Gary Curtis, (Rating, Codes & Standards Committee Chair) NASEO; Mike Koenig (TC Chair), Andersen Windows; and Steve Pereira, CAWM.

One of the responsibilities of the voting members will be to work with other interested NFRC member to ensure that TIs are written in the most effective and comprehensive manner possible. I will be developing a list of NFRC members interested in reviewing draft TIs during the 15 day review period (see below). Any NFRC member wishing to be on this list should contact me by fax (510-486-4089).

The TIPC is currently considering 9 TI requests which relate to NFRC 200. Copies of these interpretation requests, which will be voted on by the TIPC March 1, will be available at the Atlanta Task Group Meeting registration desk and are also available from staff. The new TI process is described in detail below:

1. A TI request is submitted and assigned to an NFRC staff member.
2. The NFRC staff member(s) decides if the request necessitates an interpretation. Staff will consult with the TIPC Chair as necessary.
3. If a TI is needed, the staff member works with the TI requester to word the question and to organize for presentation any relevant background information.
4. The question and background information is then forwarded to the Chair who assigns at least two members (at least one voting mem-

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NFRC Meeting Schedule

1996

April 16-20, 1996
NFRC Spring Membership Meeting
Royal Sonesta Cambridge
Cambridge, Massachusetts

June 18-19, 1996
NFRC Laboratory & IA Workshop
Sheraton Fiesta San Antonio
San Antonio, Texas

June 20-21, 1996
NFRC Task Group Meetings
Sheraton Fiesta San Antonio
San Antonio, Texas

September 17-21, 1996
NFRC Fall Annual Meeting
Loews Ventana Canyon
Tucson, Arizona

November 7-8, 1996
NFRC Board of Directors Meeting
NFRC Offices
Silver Spring, Maryland
(301) 589-NFRC

1997

April 13-17, 1997
NFRC Spring Annual Meeting
Loews Vanderbilt Plaza
Nashville, Tennessee

September 7-11, 1997
NFRC Fall Annual Meeting
Bally's Casino & Resort
Las Vegas, Nevada

November 6-7, 1997
NFRC Board of Directors Meeting
NFRC Offices
Silver Spring, Maryland
(301) 589-NFRC

NFRC and American Airlines

Meeting Saver Fares save time and money when you fly with American Airlines to the National Fenestration Rating Council's meetings in various cities from February 13-November 10, 1996

Meeting Saver Fares offer you 5% off AAnytime and PlanAAhead Fares or 10% off Y26 Coach Fares when you fly American Airlines to any of NFRC's meetings in 1996.

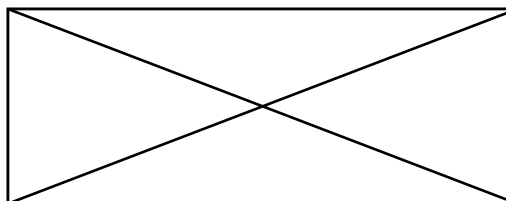
American has created a special STAR file number in their computer containing information about each meeting in order to serve you better. The Meeting Saver Fare offer is available by calling **1-800-433-1790** and speaking to an agent at American's Meeting Services Desk. If you normally use the service of a travel agent, please have them place your reservations through the number listed below to obtain the same advantage for you.

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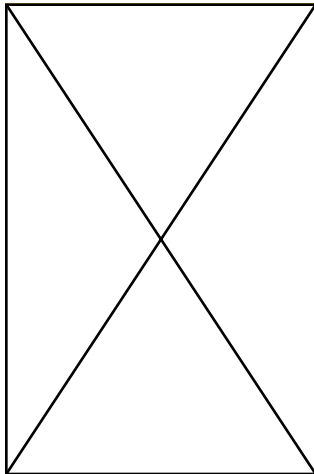
Chairman's Corner

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- the decision making structure within the organization, including specific descriptions of each of the Board seats and the scope of responsibility for each of the standing committees, subcommittees, and task groups.
- the structure of the committees themselves and their formation, for example, who is eligible to vote and how one can be a member of a specific committee.
- the types of meetings NFRC holds.
- the voting procedures including the resolution of a negative vote to a written ballot.
- the procedures for adoption and modification of the rating procedures and product certification program documents.
- technical or program interpretations process.

In the event of a conflict between the Operating Policies and the NFRC Articles of Incorporation or Bylaws, the Articles or Bylaws shall govern.

I'd like to get away from the topic of the operating policies manual and end this issue's *Chairman's Corner* with an expression of my heartfelt thanks to Herb Yudenfriend for his dedicated service to NFRC. Herb's service to NFRC, as the first chairman of the Public Relations Committee, has been unwavering since the Council's inception. Herb has assured me that we can continue to count on him for his support of NFRC's mission and as always...a good joke. Thank you, Herb! n



New Additions at NFRC

BIPIN SHAH

Education :

Graduate degree in Mechanical Engineering with Thermodynamics and Heat Transfer as Major subjects. Graduated from California State University Fullerton.

Job experience:

Four Years of fenestration testing experience. Test engineer-in-charge of thermal testing and NFRC certified simulator, at Fenestration Testing Laboratory Inc. Seven years of other engineering related experience.

Job Responsibilities:

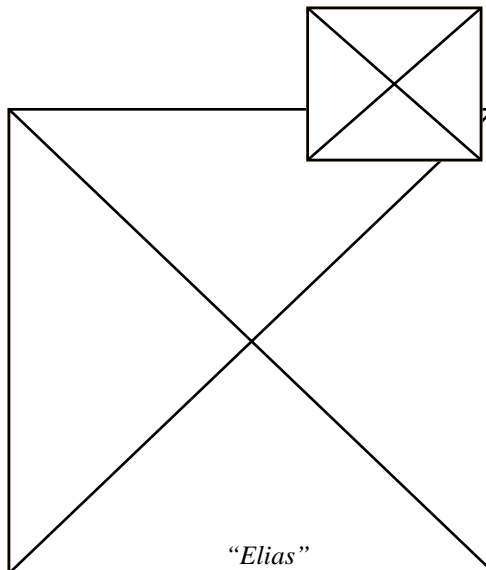
Will be responsible for the simulation laboratory accreditation program for the NFRC



"Bipin"

ELIAS CHACON

Elias Chacon graduated from Manhattan College, NY with a Bachelors Degree in Electrical Engineering. He was employed by Lederle Laboratories for 3 years as Project Engineer/Service Electrical Engineer. He was involved in designing and installing heavy electrical power equipment. A Certified Personal Fitness Trainer, he does personal training on his free time. Presently he is engaged to Dr. Sandra Ortiz, who is a pediatrician at Children's Hospital, Washington, D.C.



"Elias"

Michael Curtis, from Cardinal IG, has been appointed the new Chairman of the Public Relations Committee. Prior to joining Cardinal IG, Mike worked for a window manufacturer in Atlanta, Georgia in both the service and sales areas and then went on to become a partner in a millwork business in Atlanta and Florida. He then bought a snow shovel and moved back to Minnesota to become National Sales Manager for Cardinal and has recently assumed responsibilities as Manager of Energy Regulatory Communications Group to assist all 50 states, utilities and national building code groups in specifying energy conserving products. If you would like to join the PR Committee or assist with its important work, please call either Mike or the NFRC Staff. Mike's telephone number is 612-932-6600.

For more information on:

- Administrative & Membership—Susan Douglas
- Certification Agency Program—Dan Wise/Elias Chacon
- Communication and Education—Susan Douglas
- Compliance Assurance Program—Susan Douglas
- Laboratory Accreditation Program—Dan Wise/Bipin Shah
- Meetings/Newsletters—Melisa Auerbach
- Product Certification Program—Dan Wise
- Publication Orders—Tina Griffin

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NFRC 900 Ratings: The Technical Accomplishment and Our Challenge for the Future

by Jim Larsen, Cardinal IG
 Chairman, Annual Energy Performance Subcommittee

In November the NFRC Board of Directors and Membership approved one of the most dramatic technical achievements ever undertaken by the window industry—a procedure for evaluating the relative energy performance of different windows from a whole house, heating and cooling perspective. This procedure, NFRC 900, represents the culmination of the technical component of NFRC's mission and our charge under the Energy Policy Act of 1992—to establish an "energy" rating and labeling system whereby consumers can compare products to make more energy informed purchase decisions. This article will give a brief overview of this technical accomplishment and provide some thoughts and challenges on what NFRC's next steps must be to successfully deliver this "product"—NFRC energy ratings for heating and cooling—to the marketplace.

NFRC members have worked unflaggingly over the past six years to lay the foundation for NFRC 900 ratings

NFRC members have worked unflaggingly over the past six years to lay the foundation for NFRC 900 ratings. To develop an energy rating we must first have accurate and reliable measures for the "indices" that become the inputs to that rating: NFRC procedures *NFRC 100-91SM*, 200, 300, 301, and 400 have delivered on the technical accuracy required for these indices. The NFRC Product

Certification Program, Certification Agency Program and Laboratory Accreditation Program (PCP, CAP, and LAP) have put in place a system to ensure the continued reliability of these component ratings.

The NFRC 900 procedure uses certified U-factors, Solar Heat Gain Coefficients, and Air Leakage values (derived from the *NFRC100-91SM*, 200, and 400 procedures, respectively) to determine seasonal or "annual" energy performance for a particular product. This is the first time in NFRC that we have looked at fenestration in the context of how it performs as part of a building system. Until now, we have focused on the individual components of fenestration heat transfer. Now, using advanced energy simulation tools developed by DOE, we can take these individual performance components and predict the building savings for both heating and cooling energy.

How can we make such a prediction using only window properties? The AEP subcommittee developed a base house model, following essentially the same set of building construction assumptions as used for the CABO Model Energy Code. We then subjected the building to 30 different climates, different glazing-to-the-floor-area ratios, different orientations, different insulation levels, and many other variations to assess the energy performance of 12 different window systems. Over 10,000 energy simulations were performed. As we analyzed the energy data, the observation was made that the

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Update on the NFRC Condensation Resistance Subcommittee

by Michael Glover, Edgetech IG
Chairman, Condensation Resistance Subcommittee

Enroute to a comprehensive set of window energy standards, the National Fenestration Rating Council Incorporated is now down to one of its last unresolved performance criteria—condensation resistance. In an effort to come to grips with what is one of the most difficult and contentious issues to date, the Condensation Resistance Subcommittee is working very closely with various North American window research groups to develop the new NFRC test procedure.

At present, condensation resistance standards in both the United States and Canada are based only on laboratory testing. Because most window manufacturers now offer a large number of glazing options, it was realized that the cost of testing all these glazing options would be exorbitantly high. The direction of the Condensation Resistance Subcommittee has been to follow the example of the NFRC U-value Subcommittee to develop a test method that is based on both laboratory testing and computer analysis.

For the condensation resistance procedure, the general proposed approach is to use computer analysis for determining window surface temperatures of typical residential windows, but then use laboratory testing for more complex window types like skylights, garden windows, and curtainwall systems.

Until recently, the problem with using the existing NFRC-approved computer program for determining window surface temperatures, FRAME, has been that this simplified program could only determine the average or mid-height, edge-of-glass temperatures. Although as any homeowner can easily observe on a cold winter's day, bottom perimeter glazing-edge temperatures are typically much colder. This is because of cavity convection flow within the sealed unit.

Based on research carried out at the University of Waterloo, Ontario, the new FRAME 4.0 program

now addresses this issue of cavity convection flow and incorporates a special calculation procedure for determining bottom-edge glazing temperatures. In addition, other window thermal analysis programs like LBL's new THERM program are also planning to incorporate a simplified procedure for determining bottom-edge glazing temperatures.

To validate the accuracy of this new generation of condensation-predicting perimeter-edge programs, a

surface temperature task group has been set-up as part of the ASHRAE fenestration U-value committee. This special ASHRAE task group is also part of an initiative to coordinate government-sponsored window research in North America and includes representatives from the leading research groups in both the United States and Canada.

Rather than evaluate complete window assemblies, the first phase of the validation project has only

looked at simple glazing unit assemblies. Four different organizations were involved in the round-robin testing program. The Lawrence Berkeley Laboratory and the Canadian National Research Council were responsible for laboratory measurements using thermographic analysis. The University of Massachusetts and the University of Waterloo, Ontario were responsible for detailed computer analysis using sophisticated 3-D programs. The measured and calculated results from these four laboratories have then been independently compared to the calculated results from the simplified programs.

Although the full results of this first phase round-robin testing program will not be formally published until the next ASHRAE summer conference, the initial feedback is that agreement has been achieved and it is worthwhile to start the second phase of the validation project.

For the upcoming NFRC task group meetings in Atlanta, Georgia a key technical issue that needs to be addressed is: At what height above the bottom

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mid-point glazing edge should condensation resistance be calculated? For laboratory testing, it has been proposed that three bottom-edge thermocouples should be located 1/2" from sightlines at the bottom two corners and bottom mid-point. For computer calculations, it has generally been agreed that because the simplified programs do not take into account the impact of interior film coefficients, 3-D convective flow or air leakage effects, the calculation point should be somewhat closer to the sightline. Systematically determining where this calculation point should be located is the key outstanding issue and

resolving this question may require some additional research.

For the Condensation Resistance Subcommittee, our goal has been to develop a fair, accurate, and credible test method. We are also interested in developing a test method that is reasonably affordable. Achieving this last objective has taken much longer than originally anticipated, but with the strong participation of the window research community, the subcommittee is now making progress and a draft standard should be available by the NFRC autumn meeting. □

Are you registered?

NFRC Spring Membership Meeting
April 16-20, 1996
Royal Sonesta Cambridge
Cambridge, Massachusetts

NFRC 900 Ratings

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relative differences between products remained similar despite wide variations in climate, building type, etc. For example if window "B" saved 20 percent on the building heating requirements in Minneapolis versus window "A," this same comparison saved nearly the same 20 percent for the heating requirements in Phoenix. Despite significant differences between building types and climatic induced heating and cooling loads, this comparative format allows the annual energy ratings to be developed based on the window's U-factor, SHGC, and Air Leakage.

Our base case for the rating format uses single-glazed aluminum-framed windows. With this baseline, almost all other window systems would save building heating and cooling energy, thereby making the rating values a positive number. The energy ratings have acronyms of FHR (short for Fenestration Heating Rating), and FCR (short for Fenestration Cooling Rating). The bigger the number, the greater the savings. With separate ratings for heating and cooling, the impact of particular fenestration products can be evaluated based on specific climate needs. But what if we want a more "exact" prediction? Just like automotive ratings where "your actual mileage may vary," your home may be different from that used to develop the FHR and FCR ratings. For example, let's say your home already has better windows in it than our baseline of single glass. How can you make an energy savings prediction and payback analysis? To handle these variations, the AEP group is working on a User's Guide that will enable consumers (users of the rating) to make annual energy savings evaluations for their specific set of conditions. The next step beyond this will be computerization of the calculation procedures that will enable consumers to quickly sort through a wide variation of options.

Even without a user's guide, the NFRC 900 ratings can be used as an "interpretative" tool for anyone trying to understand the complex interactions between U-factors, Solar Heat Gains, and Air Leakage. Consumers, regardless of house type and climate can use the energy ratings to rank products and sort out the variety of claims made by manufacturers. Window marketing people can now get a handle on the energy merits of new products and how to promote them. Utility companies and energy agencies can use the ratings in a global sense to gain an appreciation of the impacts of changes in code requirements. And finally, window engineers can use the ratings as part of the process in selecting new designs and setting targets for higher performance levels.

Where Do We Go From Here?

The technical completion of NFRC 900 and soon the 901 procedure is just the first step. As with all NFRC ratings, we must now take the necessary steps to protect the integrity of the ratings by their incorporation into the NFRC PCP, CAP, and LAP. We must now move from our focus on the "technical goals" for NFRC 900 ratings to the "market goals" for NFRC 900 ratings.

To do this we must also re-prioritize our efforts within NFRC. We now need to focus on how we best deliver this important new rating to the appropriate marketplace in the appropriate manner. We must design a label that effectively communicates these energy ratings while protecting against their misuse. We must consider the many various "users" of this information and

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Board of Directors Approves Establishment of TIPC

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- ber) to work with the requester to develop a proposed answer within 15 working days.
5. The question, background information, and proposed answer is circulated via e-mail and fax to solicit other opinions. Any advisory (non-voting) member and any NFRC member who demonstrates an interest in the issues will also have an opportunity to get their comments (if they have any) to the TIPC Committee members.
 6. Members are to hold conference calls during alternate Board conference call months (or have time allocated at NFRC Membership meetings) to discuss and vote on any issue which has been in circulation for at least 15 working days. Members can vote to accept the proposed answer, accept with changes, or send back to the same group or a revised working group.
 7. Upon approval by the standing TIP Committee, the Technical Interpretation is considered adopted as of that date, subject to approval by the Board of Directors, or on a date set by the Committee and/or the Board. Also upon approval of the Technical Interpretation from the Technical Interpretation Policy Committee and/or Board of Directors, the new TI is assigned a TI number and will be published for insertion into the NFRC Technical Interpretation manual. n

NFRC 900 Ratings

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make sure we have the necessary educational materials for their use. Homeowners need different information than code officials. Builders need different information than retailers. Remodeling contractors need different tools than architects.

Another challenge we face is the inertia of our own efforts. Before we can deliver NFRC 900 ratings to the marketplace, we must have all of the other rating support systems in place and operational to ensure their accuracy. Although the NFRC 200 and 400 technical procedures are finalized, we have not yet completed the laboratory accreditation and certification program procedures to support their delivery to the marketplace. NFRC-certified Solar Heat Gain Coefficients and Air Leakage values are required for determining NFRC 900 values. We must maintain the credibility of U-factor, SHGC, and Air Leakage values for NFRC 900 ratings to have any true market value.

Once these additional operational and communications procedures are in place, how can the participants in the NFRC certification program maximize the value of their NFRC 900 ratings? The answer is simple: LABEL, LABEL, LABEL. Whether the product is slated for retail distribution, a remodeling project, new construction or for international markets, the NFRC energy rating label must be present. We must all commit to helping achieve our ultimate mission - energy rating label for consumers. All consumers. Our job is not yet complete. We have accomplished a major technical milestone with the NFRC 900 rating procedure. Now let's all commit to delivering our "product" effectively to the market. n

We welcome and encourage any contributions you may have for the **NFRC Update**. Please direct your inquiries to:

Melisa Auerbach

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